

Listing of Claims

The following listing of claims replaces all previous versions, and listings, of claims in the present application.

1. (Currently amended) A trapezoid signal generating circuit comprising:

a capacitor for producing and outputting a trapezoid signal generating circuit trapezoid signal;

a first current output circuit ~~for flowing~~ connected to the capacitor for supplying to the capacitor a charging current having a command first magnitude;

a second current output circuit ~~for flowing~~ connected to the capacitor for supplying from the capacitor a discharging current having a command second magnitude which is K times ($K > 1$) the charging current when a waveform control signal applied to the second current output circuit is at a first level, and stopping the discharging current when the waveform control signal is at a second level; and

a current control circuit for receiving a trapezoid signal generating circuit input signal and being connected to the first current output circuit and the second current output circuit for supplying the first current output circuit with a command signal based on the input signal so that the charging current continuously increases from a first time point when the waveform control signal changes from the first level to the second level and continuously decreases after [[a]] the trapezoid signal produced and output by the capacitor reaches a predetermined reference level, and for supplying the first and the second current output circuits with the command signal so that both of the charging current and the discharging current continuously increase from a second time point when the waveform control signal changes from the second level to the first level and continuously decrease after the trapezoid signal reaches the predetermined reference level.

2. (Currently amended) The trapezoid signal generating circuit according to claim 1, wherein the current control circuit generates the command signal so that the charging current and the discharging current increase and decrease in accordance with a linear function with respect to an elapse of time from [[a]] each time point of a level change between the first level and the second level in the waveform control signal.
3. (Currently amended) The trapezoid signal generating circuit according to claim 1, wherein the current control circuit generates the command signal so that the charging current and the discharging current increase and decrease in accordance with a quadratic function with respect to an elapse of time from [[a]] each time point of a level change between the first level and the second level in the waveform control signal.
4. (Currently amended) The trapezoid signal generating circuit according to claim 1, wherein the predetermined reference level is set to one half of a power supply voltage, and the current control circuit generates the command signal so that each of the charging current and the discharging current increases and decreases at changing rates equal to each other.
5. (Currently amended) The trapezoid signal generating circuit according to claim 1, wherein the current control circuit generates the command signal, which enables a continuous flow of a first predetermined offset current as the discharging current while the waveform control signal is at the first level, and enables a continuous flow of a second predetermined offset current as the charging current while the waveform control signal is at the second level.

6. (Currently amended) The trapezoid signal generating circuit according to claim 1, wherein:

the first and the second current output circuits ~~are constructed to~~ respectively produce the currents charging current and the discharging current in accordance with ~~an input~~ the command voltage signal;

the current control circuit ~~is constructed to have at~~ includes one or more cascade-connected charging and discharging ~~circuit~~ circuits and produces the command ~~voltage~~ signal from a last one of the ~~charging and discharging circuit~~ one or more cascade-connected charging and discharging circuits; and

the one or more cascade-connected charging and discharging ~~circuit~~ is constructed with circuits each include a command signal capacitor which produces ~~a voltage from both terminals~~ the command signal, and a charging and discharging control circuit which charges the command signal capacitor with a first current corresponding to an input voltage from ~~[[a]]~~ each time point of a level change between the first level and the second level of the waveform control signal and discharges the command signal capacitor with a second current corresponding to ~~[[an]]~~ the input voltage after the trapezoid signal reaches the predetermined reference level.

7. (Currently amended) The trapezoid signal generating circuit according to claim 6, wherein the current control circuit ~~is constructed with~~ includes a single-stage charging and discharging circuit, and a fixed voltage is applied to the single-stage charging and discharging circuit.

8. (Currently amended) The trapezoid signal generating circuit according to claim 6, wherein the current control circuit ~~is constructed with~~ includes a two-stage charging and discharging ~~circuit~~ circuit, and a fixed voltage is applied to a first ~~one~~ stage of the two-stage charging and discharging ~~circuit~~ circuit.

9. (New) A trapezoid signal generating circuit comprising:

a reference signal input for receiving an input signal;

a current control circuit coupled to the input for receiving the input signal and for generating and outputting a command signal based on the input signal;

a first current output circuit coupled to the current control circuit for receiving the command signal from the current control circuit;

a second current output circuit coupled to the current control circuit for receiving the command signal from the current control circuit;

a capacitor coupled to both the first current output circuit and the second current output circuit for producing a trapezoid signal based on currents supplied by the first current output circuit and the second current output circuit; and

a circuit output for outputting the trapezoid signal produced by the capacitor, wherein the first current output circuit is for supplying to the capacitor a charging current having a first magnitude, and

the second current output circuit is for supplying from the capacitor a discharging current having a second magnitude which is K times ($K > 1$) the charging current when a waveform control signal applied to the second current output circuit is at a first level, and is for stopping the discharging current when the waveform control signal is at a second level.

10. (New) The trapezoid signal generating circuit of claim 9, wherein the current control circuit is for supplying the first current output circuit with the command signal so that the charging current continuously increases from a first time point when the waveform control signal changes from the first level to the second level and continuously decreases after the trapezoid signal produced by the capacitor reaches a predetermined reference level, and for supplying the first and the second current output circuits with the command signal so that both of the charging current and the discharging current continuously increase from a second time point when the waveform control signal changes from the second level to the first level and continuously decrease after the trapezoid signal reaches the predetermined reference level.